Equipping SCDNR GIS Users

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Problem Statement

Geographic Information Systems (GIS) is used across all divisions at SCDNR. More staff than ever are interested in using GIS to improve or inform their work. This interest has been observed in increased new requests for GIS software installation and access to GIS resources. SCDNR staff already using GIS have expressed dissatisfaction at the lack of support and opportunities to become more proficient.

SCDNR has a central GIS office within the Information Technology program. The goals of the central GIS office are to manage GIS software applications, provide support to GIS users across all divisions, and manage a central GIS database for the agency. While SCDNR has a strong history and an important legacy with GIS in South Carolina, a cohesive strategy for managing GIS technology across the agency has since dissolved. GIS is being used in silos across the agency. The central GIS office has become disconnected from users, and users from each other. As a result, GIS users at SCDNR are under-supported and ill-equipped.

Supporting GIS well impacts the agency's effectiveness in meeting the following as expressed in SCDNR's Vision Statement:

> "Our vision for the DNR is to be *a trusted and respected leader* in natural resources protection and management, by *consistently making wise and balanced decisions* for the benefit of the state's natural resources and its people." (emphasis added)

To be a "trusted and respected leader", we must use our tools well to produce information that meet the expectations of our stakeholders (internal and external). GIS is a critical tool for making "wise and balanced decisions" because natural resources are inherently spatial. Thus, GIS is a critical tool for the agency, and must be supported well.

To that end, this project investigates the question:

> *How can SCDNR staff become more proficient in Geographic Information Systems (GIS) technology and use it more effectively?*

Gap Statement

SCDNR GIS users are not equipped to use the technology, and agency GIS Managers do not have standard procedures for equipping the staff. The desired outcome of this project is that GIS users would have the resources they need to use GIS technology effectively to make wise decisions and help position SCDNR as a trusted leader in natural resources management.

Data Collection

Data have been collected through two online surveys to agency GIS users. The surveys were sent to the GIS Users email group, which consists of 119 SCDNR staff who use GIS in varying capacities. They assessed the participants' knowledge of GIS support available, their satisfaction with those resources (or lack of resources), and kinds of support they would like to see available in the future. The first survey focused on access to GIS data, and how users currently use the technology. Forty-five (45) users responded to this survey. A second survey focused on access to GIS support and resources, their level of satisfaction with GIS support, and how they would like to see GIS support improved. Thirty-seven (37) users responded to this

survey. All but one SCDNR division are represented. Participants range from everyday users to infrequent users.

Surveys were used as the primary data collection method because the problem and the solution are both defined by the users. GIS Managers need to know the needs of the users to provide appropriate support and match knowledge of the technology to the work that the users need to accomplish.

Additionally, the central GIS office at SCDNR is currently participating in consulting agreement with our software vendor, Esri. The vendor makes experts available to improve the implementation of all aspects of their software and services. Through this program, SCDNR GIS managers have undertaken an exercise with a change management professional. A part of this process included interviewing a cross-section of agency staff. Much information has been gleaned from these interviews about expectations for GIS support. Details from these interviews have been extracted and analyzed to help inform this project.

Support is used frequently in this report. In the context of this project, support means the ways in which the agency provides resources and opportunities for GIS users to become more proficient with GIS technology.

GIS technology is used in this report to mean all the possible components of Geographic Information Systems. Components of GIS include, but are not limited to, desktop GIS software, cloud-based (i.e. web-based) GIS, mobile GIS for viewing and collecting field data, public-facing mapping applications, GPS and GNSS data collection, database management, and spatial analysis and modeling.

GIS Managers is used in this report to mean the 5 GIS professionals at SCDNR working among different divisions, whose collective role it is to support GIS operations at the agency.

Data Analysis

Data were analyzed from two user surveys and from information extracted from interviews. Key insights from the data analysis are underlined for emphasis.

User Survey 1: Access to GIS Data

Forty-five (45) users responded to this survey. The complete itemized results of the survey are found in Appendix A. Two-thirds of those that responded are frequent GIS users; they use GIS once a week or more. The other third use GIS less frequently. Most respondents use GIS to make static maps and to visually analyze data. Fewer (though still not small) number of respondents use GIS for more specific tasks, like field data collection, spatial analysis, or online and mobile applications. SCDNR staff make use of a wide variety of data. Respondents were asked to select all that apply from 12 categories of GIS data that they find most useful. Eight (8) of the 12 categories were selected by 50% or more of the respondents. The lowest category was still used by 15% of the respondents. <u>The results from this set of questions illustrate the diversity of GIS users and the applications for the technology. Plans to support these users need to meet that diversity.</u>

Respondents currently access GIS data in a variety of ways. Two-thirds of respondents find data on a common network folder, but many download their own GIS data from sources and keep GIS data on a network location for their working group. A large portion of respondents indicated trouble finding GIS data they need. Thirty-three percent (33%) responded that it was

easy, but the other two thirds replied neutral (47%), difficult (16%), or very difficult (4%) to find GIS data they need. For the data that they can find on the SCDNR network, two thirds find the data helpful or very helpful. The other third responded neutral, not very helpful, or no help at all. The results to these questions and subsequent open-ended responses indicate agency GIS users do not know where to find helpful GIS data or are interested in data we are not providing. Further, they are looking for data in those categories that are most important to GIS users.

A surprising number of people have looked for GIS resources on the agency's intranet in the last year. The intranet pages for GIS are out of date, which means they are finding unhelpful information there.

The results of this survey illustrate that improvement is needed for the most basic component of GIS: access to appropriate data. In addressing this, GIS managers need to consider the diversity of GIS users, the data they need, and their applications of the technology.

User Survey 2: Access to GIS Support

Thirty-seven (37) users responded to this survey. The complete itemized results of the survey are found in Appendix B. A similar cross-section of users responded to this survey compared to the first based on the initial question of "How often do you use GIS in your work?" There is likely substantial overlap of respondents between the two surveys. Sixty percent (60%) of the respondents use GIS once a week or more. The users were asked to rate their skill level in GIS. Most responses were within the categories of novice (43%) or intermediate (41%). Four respondents reported expert (11%), and two (5%) reported no experience. Users were asked about the specific GIS technologies they used. The results of this question indicate a diversity of GIS technology and software used. Some responses include technology that is not provided by our primary GIS software vendor. Of particular importance, the primary desktop GIS software

that respondents currently use (ArcMap) is being phased out and replaced. Only 3 respondents (8%) reported using the new software (ArcGIS Pro) that is replacing the old. However, responses to a subsequent question reveal that users are interested in learning this new software.

Users are generally dissatisfied with opportunities provided by SCDNR to become more proficient with GIS technology. Seventy-eight percent (78%) of responses were neutral, dissatisfied, or very dissatisfied; or to flip the statistic, only 22% were satisfied or very satisfied. Ways that GIS users are most frequently finding support including seeking out training online on their own and receiving one-on-one help from other GIS users or GIS Managers.

Despite the dissatisfaction with opportunities to increase proficiency, users feel that GIS is currently a very valuable (51%) or valuable (41%) tool for their program. Additionally, 70% of respondents indicate that increased access to GIS learning opportunities would significantly increase the value of GIS to their program. These responses highlight the critical role of GIS at the agency and the need to provide robust GIS support.

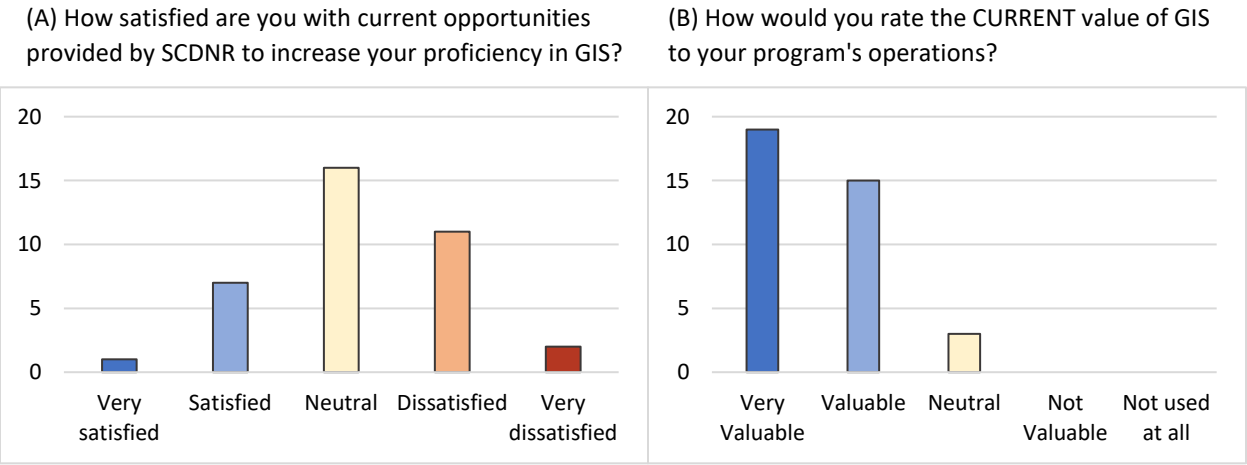


Figure 1. These two charts viewed together illustrate the importance of improving GIS support at SCDNR. (A) Users are dissatisfied with current opportunities to improve their proficiency in GIS and (B) they feel that GIS is valuable to their work.

Two categories of users emerged from responses to this survey. Some users know about the capabilities of GIS but want to learn how to do it. Others want to learn more about the capabilities of GIS. These categories illustrate that support should focus on both raising awareness and developing technical skill.

Finally, users were asked to rank their answers to two questions: “What topics are you interested in learning more about?” and “What kinds of resources would be helpful for increasing your skill and use of GIS?” Ranking results from either question were not concentrated into a few answers; rather, they were spread out among the results. This reveals the diversity of topics and formats GIS users have interest in. Meeting the diversity of interests in topics could present a challenge with some formats of delivery (such as in-person training), while other kinds of resources are well suited to address diverse needs (links to trusted resources online).

Digging into the rankings of these questions and comparing them the results of other questions is helpful. Currently users are most frequently finding GIS support on their own online or from other GIS users. However, the top ranked methods of support are in-person training and webinars hosted by GIS Managers. This indicates a desire for more connection to professional GIS staff at the agency. In analyzing the topics that users wish to learn more about, we see that the top answers relate to the basics of GIS. The second ranked topic is “Fundamentals of GIS”. The first and third are traditional desktop GIS software. The fifth is “Data Discovery”.

The results of this survey indicate a strong desire for more GIS learning opportunities from the GIS user community at SCDNR. Experience and interests vary, so GIS support must be flexible to meet the diversity. GIS users find the technology to be valuable and indicate increasing their proficiency in GIS will provide significant benefits to their program. Some emphasis needs to be placed on the basics while still providing support for other aspects of GIS.

Interviews

Interviews were conducted with 14 SCDNR employees representing a diverse cross-section of roles within the Wildlife and Freshwater Fisheries division (WFF), from field staff, to regional coordinators, to chiefs. The interviews were conducted by a consultant from our primary GIS software vendor. The purpose of the interviews was to inform a communications plan for implementing a new GIS technology workflow within the Wildlife section of WFF. While the scope of that project is more specific than this one and pertains to one division, the information from those interviews is very helpful for understanding how to best provide GIS support. WFF represents the largest division of GIS users, and the largest share of responses to the above surveys. While GIS workflows may vary between disciplines, the general processes and foundational aspects of the technology remain the same. Therefore, responses from these interviews can reasonably be extrapolated to other divisions.

Information about GIS support gleaned from the interviews fall into three basic categories: awareness, hands-on training, and feedback. Those interviewed stressed the importance of raising awareness of GIS technology capabilities. Further, staff need to be made aware of how the GIS technology can improve their work, make them more efficient, and make better decisions. It was commonly suggested by interviewees that success stories are shared across the agency. Secondly, those interviews almost unanimously suggested hands-on training in the field, especially for mobile GIS used for field data collection, along with other forms of support like tutorials, quick start guides, and videos. Finally, a common suggestion is that feedback mechanisms must be in place so that support can be adjusted based on experience with the technology. GIS managers will need to be flexible and tailor support based on feedback from users.

To glean the information from the interviews, personal notes were provided by the consultant and reviewed for content related to GIS support. These notes are not provided with this project, though more information about that consulting exercise can be provided on request.

Data Analysis Summary

The data analysis can be distilled into some key insights. GIS is an important tool for the agency, and staff find value in GIS for their programs. GIS is used in diverse ways and support must meet that diversity. Staff desire to improve their GIS proficiency, and it is currently difficult for them to find the resources they need to do that. Emphasis must be placed on basics, such as locating authoritative and up-to-date data and using traditional GIS desktop software. Along with developing technical skill, support should include both increasing awareness of the capabilities of GIS and helping users share their success.

Implementation Plan

An implementation plan for providing GIS support for SCDNR GIS users includes three major components:

- Increasing awareness of GIS capabilities across the agency.
- Providing trusted and authoritative resources – data, support documents, websites, training materials, etc. – in a consistent and discoverable way.
- Increase technical proficiency through access to training.

There is overlap among the three components, and some methods detailed below can be used to address more than one. As suggested by the data analysis, the diversity of needs is an important consideration for GIS support. The methods described here are flexible to meet that diversity and can be modified based on feedback.

GIS Webinar Series

A monthly GIS Webinar Series will be implemented. During the coronavirus pandemic, agency staff have become well acquainted with webinars. Webinars were ranked second among methods for providing GIS support in User Survey 2. This method can be used to address all three components. Topics will be selected based on the results of the surveys used in this project and feedback from webinar attendees. Some webinars may be focused on specific technical skills, while others will aim to raise awareness of new (or new to the agency) aspects of GIS. Opportunities will be given to GIS users to share their success stories.

Webinars will be facilitated by agency GIS Managers and will use Microsoft Teams, a technology already in use across the agency. Cost of implementing this method of support will be the time required by GIS managers to prepare for the monthly webinar. Communications about the webinar will be facilitated through the SCDNR GIS Users email group and through the intranet. Video recordings of each webinar will be made available on the GIS intranet web pages.

Improving GIS Intranet

A surprising number of respondents to User Survey 1 indicated they looked for GIS resources on the agency intranet, which is greatly out of date. Intranet pages for GIS will be updated to include trusted and authoritative resources about GIS at the agency. They will include where to find and how to use important datasets, where to access training and tutorials from our software vendor, links to current SCDNR GIS web applications, and other useful content. The results from the surveys will guide the priority for producing this content (e.g. which datasets are most important, which training resources to link to based on software used). This will be an important resource for providing feedback. GIS professionals at the agency will be listed here and a survey will be placed on the intranet to solicit comments and feedback continually.

The communications office recently began an initiative to redesign the agency intranet. The website template has been approved and they are in the process of migrating content. This provides an excellent opportunity to update GIS content on the intranet. Staff working on this initiative have been in contact with GIS Managers, who will be given access to update content on the new intranet pages.

One challenge to this method of support will be keeping the content up-to-date. Updating the content will need to be an expectation communicated to agency GIS Managers. An initial communications effort will be needed to inform GIS users about the new intranet pages. This can be done through the GIS Users email group.

This effort primarily addresses the second component – providing trusted resources in a discoverable way. The content provided there will help to address the other components of increasing awareness and developing skill.

Learning Plans

Esri, the software company which provides our primary GIS software, has a system for developing learning plans for every aspect of the technology they provide. There are pre-developed plans that can be customized. A learning plan consists of a series of resources such as tutorials, online trainings, webinars, videos, and web links which are organized sequentially to guide someone through a topic. The goals of learning plans range from providing a general awareness to developing skills in specific technologies. Learning plans can be assigned to users and the website tracks their progress.

SCDNR GIS Managers will develop learning plans, focusing on two aspects of GIS identified as most important in the surveys. As previously mentioned, only a small percentage of GIS users are using ArcGIS Pro (the new GIS software), which will soon replace the previous

software. While few people are using it, it was the highest ranked topic that survey respondents wanted to learn more about. Second and third ranked topics were “Fundamentals of GIS” and “ArcMap” (the older GIS software).

The first learning plan to be developed will be transitioning to ArcGIS Pro. A default learning plan exists for this, but it will be customized to include some additional fundamentals of GIS items, and additional help for those who are very familiar with ArcMap and who are hesitating to make the switch.

The second learning plan that will be developed is for field data collection. This was the fourth ranked topic in the survey and makes up a growing share of interest in learning GIS, especially from field staff who are technologically oriented. An existing learning plan for field data collection will be customized.

SCDNR has access to a training consultant with Esri through our annual licensing contract. This person will help SCDNR GIS Managers with developing learning plans. Learning plans are free, but sometimes include content like advanced training that must be paid for. Those aspects of the learning plan can be made optional unless a program wishes to provide the funds for accessing it.

A potential obstacle for implementing learning plans will be encouraging busy staff to take the time to work through them. However, because they are self-paced and available online, staff can complete them as they are able. Secondly, based on results from the survey and interviews, staff still desire in-person training from GIS professionals and may view this is another hands-off approach from GIS Managers. It will need to be clearly communicated that these learning plans can be used as a foundation on which in-person training can be built. More

time in person can be spent on applying the technology to agency needs instead of teaching basics. Leadership will be made aware of the learning plans for their employees.

This method of support primarily addresses the third component, developing technical proficiency. However, some existing learning plans are awareness oriented and can be linked from the intranet and advertised in webinars.

Standard Procedure for New GIS Users

A standard procedure will be developed for when a user requests access to GIS technology, which will include completing on-boarding learning plans before they get access. This will ensure a baseline knowledge for each new user. In speaking with the training consultant at Esri, this is a common practice at organizations with a large GIS presence.

Learning plans can be customized with content from outside of the Esri organization. GIS Managers will include relevant GIS documents and web resources in the on-boarding learning plans. This content will be already developed and available on the intranet.

This could cause some new users to feel delayed in getting access to a tool that they need. It will need to be communicated to new users that the process will get them familiar with SCDNR's GIS resources quicker, which will have them using the technology more efficiently sooner.

This method addresses some of all three components. New GIS users will be trained at a baseline level and made familiar with GIS resources at the agency.

Other Considerations

In-person training is expressed as a desire in the survey and in interviews. However, these trainings are a challenge for SCDNR GIS Managers because of limited time and the breadth of topics users wish to be trained on. To meet this need, GIS Managers will assess the need for in-

person training based on feedback gathered from the methods mentioned above. Some specific projects or technology implementations will require in-person training, but that training will be tailored to meet those specific needs. GIS Managers can use the methods above to establish foundational knowledge and build from that for in-person training when needed. The goal of implementing the prior methods first is that the time required from GIS Managers is minimized and they can focus on more specific projects where their expertise is valuable.

One major obstacle is that some field staff in field offices have poor internet connection. This creates issues for accessing data, using the software, and taking advantage of the resources above, which are all internet based. GIS Managers are currently talking with field staff about how to overcome this connectivity issue.

Evaluation Method

Evaluation of the plan will be both continual and periodic. First, feedback solicited from webinars and through the intranet will provide continual data from which we can evaluate the support we are providing. Second, surveys will be sent out annually to assess GIS users' experience with GIS support and help us understand what can be improved. A key to this evaluation will be finding out if our efforts are improving their feeling of support and if the support is adding value to their program.

Learning plans will be tracked, and user progress will be reported. Questions which will be asked to evaluate the success of learning plans are; are users completing learning plans, and if not, which aspects of the learning plans are roadblocks to completing?

The number of staff using certain GIS technologies can be counted. Since we are focusing on increasing use of ArcGIS Pro (along with GIS fundamentals) and field data

collection applications, sustained adoption of these technologies over time would suggest that people are equipped to use them.

Summary

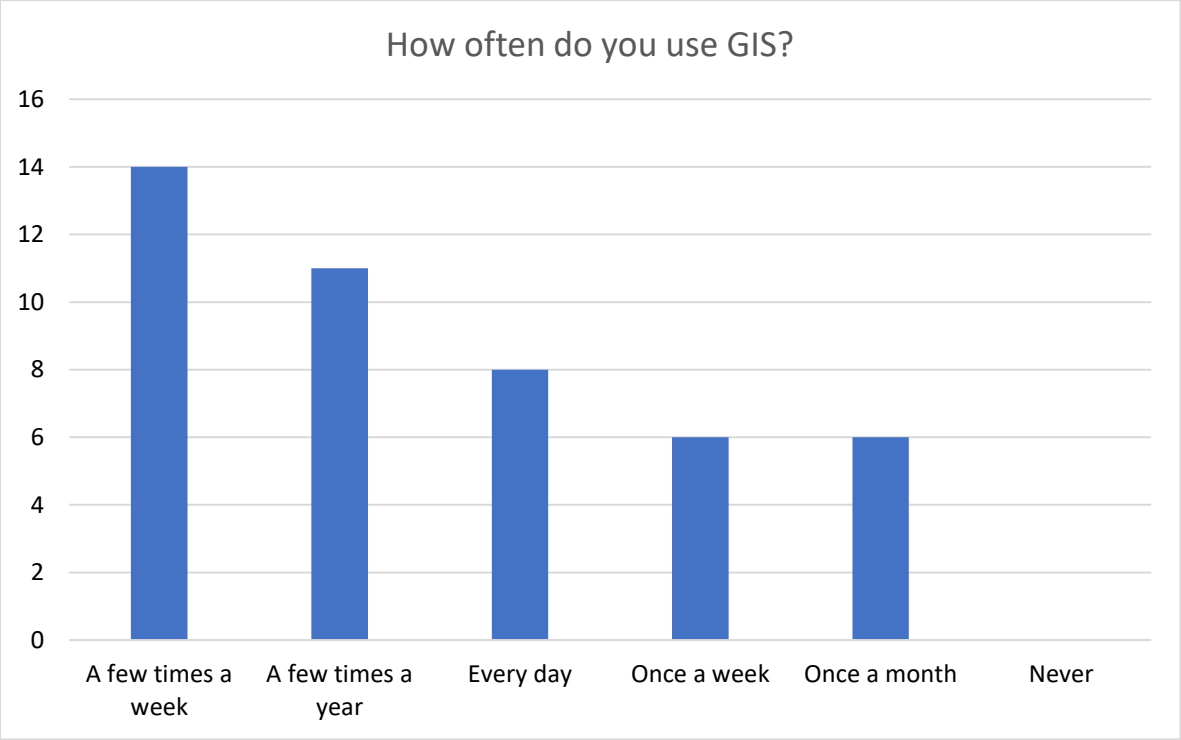
Two surveys and information gleaned from interviews revealed that SCNDR GIS users desire more support so that they will be better equipped to use GIS technology effectively. GIS support must meet a diverse set of needs across the agency. The plan outlined in this report is focused on building a foundation of proficiency from which more specific and customized training could be designed when needed. Support to be implemented include a monthly GIS webinar series, improved resources on the agency intranet, GIS learning plans, and a standard GIS on-boarding procedure.

Appendix A

Responses to User Survey 1: Access to GIS Data

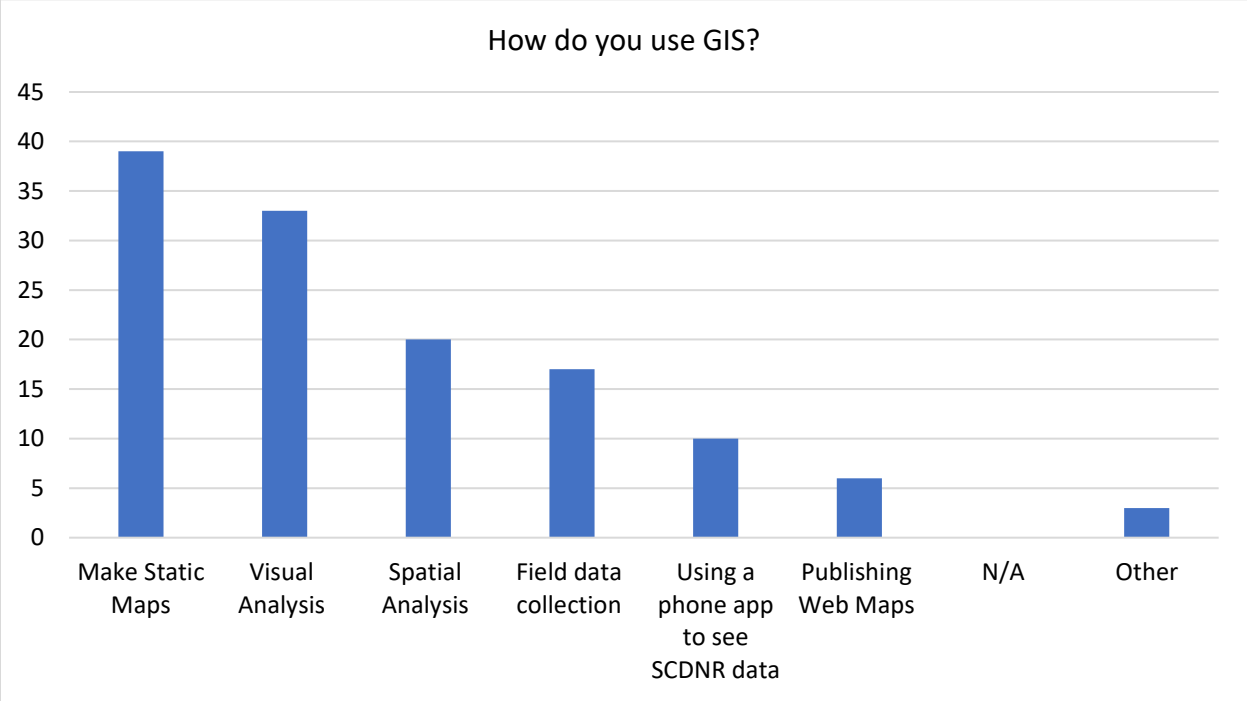
Q1. How often do you use GIS in your work?

A few times a week	14	31.11%
A few times a year	11	24.44%
Every day	8	17.78%
Once a week	6	13.33%
Once a month	6	13.33%
Never	0	0%



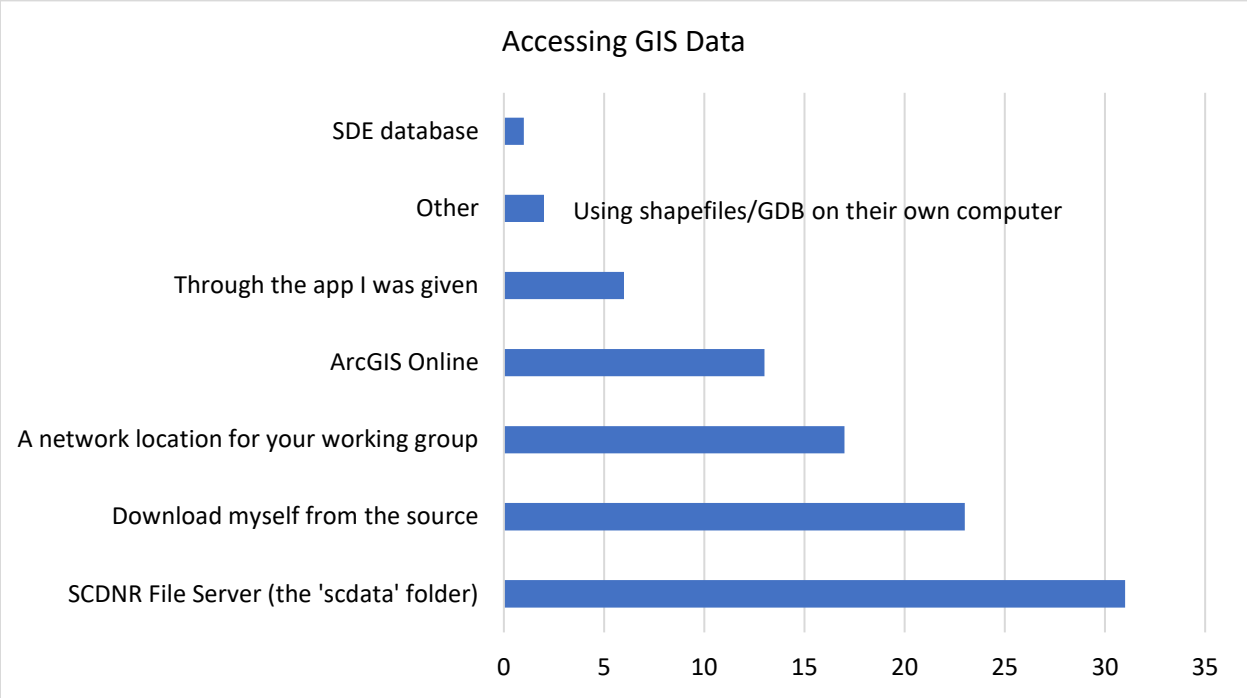
Q2. How do you use GIS?

Make Static Maps (PDF, JPG, etc)	39	86.67%
Visual Analysis (stack layers, view locations, click to find information)	33	73.33%
Spatial Analysis (using GIS tools to analyze data)	20	44.44%
Field data collection (using GIS tools to record observations, etc)	17	37.78%
Using a phone app to see SCDNR data	10	22.22%
Publishing Web Maps (making interactive maps through ArcGIS Online)	6	13.33%
N/A	0	0%
Other	3	6.67%



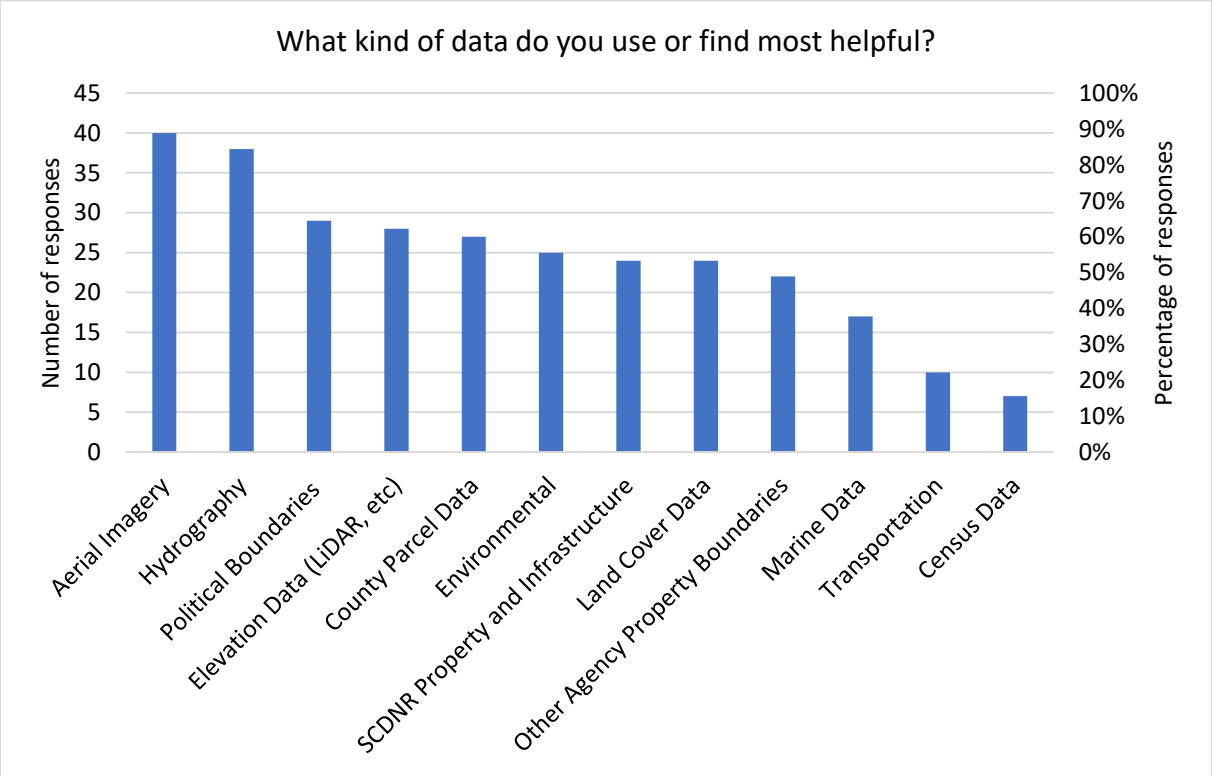
Q3. Where do you usually access GIS data?

SCDNR File Server (the 'scdata' folder)	31	68.89%
Download myself from the source	23	51.11%
A network location for your working group	17	37.78%
ArcGIS Online	13	28.89%
Through the app I was given	6	13.33%
Other	2	4.44%
SDE database	1	2.22%
N/A	1	2.22%



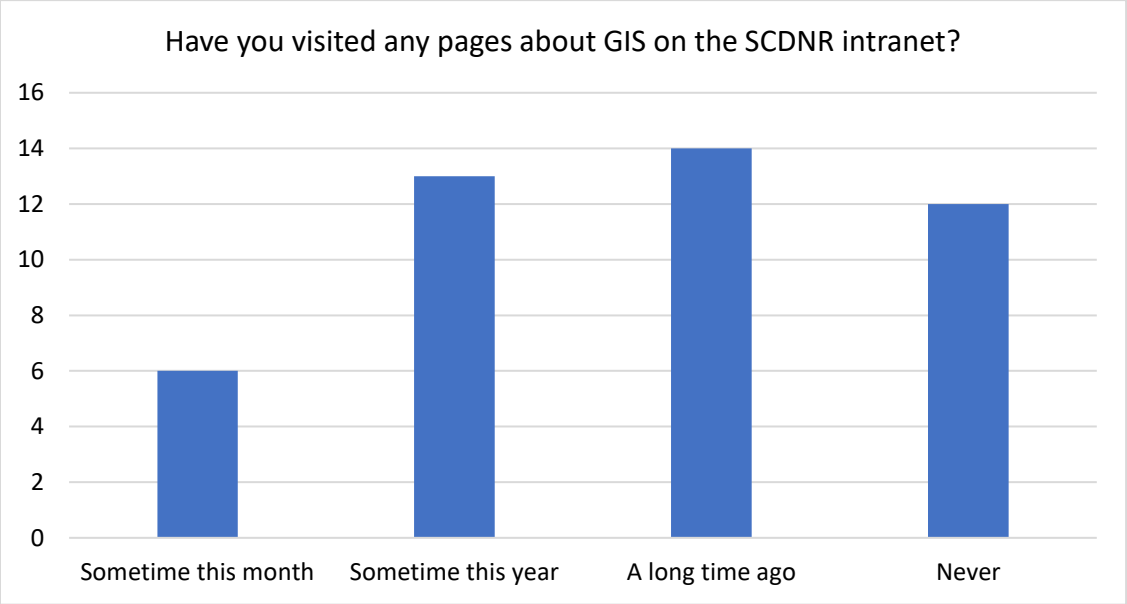
Q4. What categories of GIS do you use, or are most helpful to you?

Aerial Imagery	40	88.89%
Hydrography	38	84.44%
Political Boundaries	29	64.44%
Elevation Data (LiDAR, etc)	28	62.22%
County Parcel Data	27	60%
Environmental	25	55.56%
SCDNR Property and Infrastructure	24	53.33%
Land Cover Data	24	53.33%
Other Agency Property Boundaries	22	48.89%
Marine Data	17	37.78%
Transportation	10	22.22%
Census Data	7	15.56%
N/A	0	0%



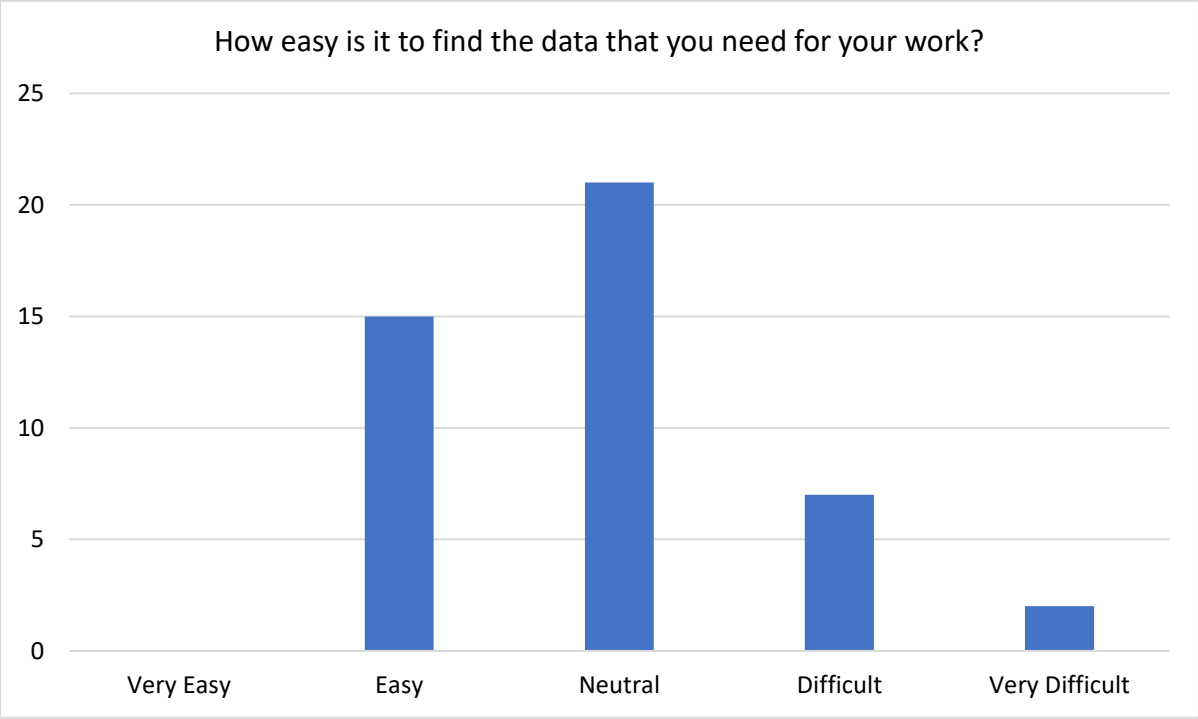
Q5. Have you visited any pages about GIS on the SCDNR intranet?

Sometime this month	6	13.33%
Sometime this year	13	28.89%
A long time ago	14	31.11%
Never	12	26.67%



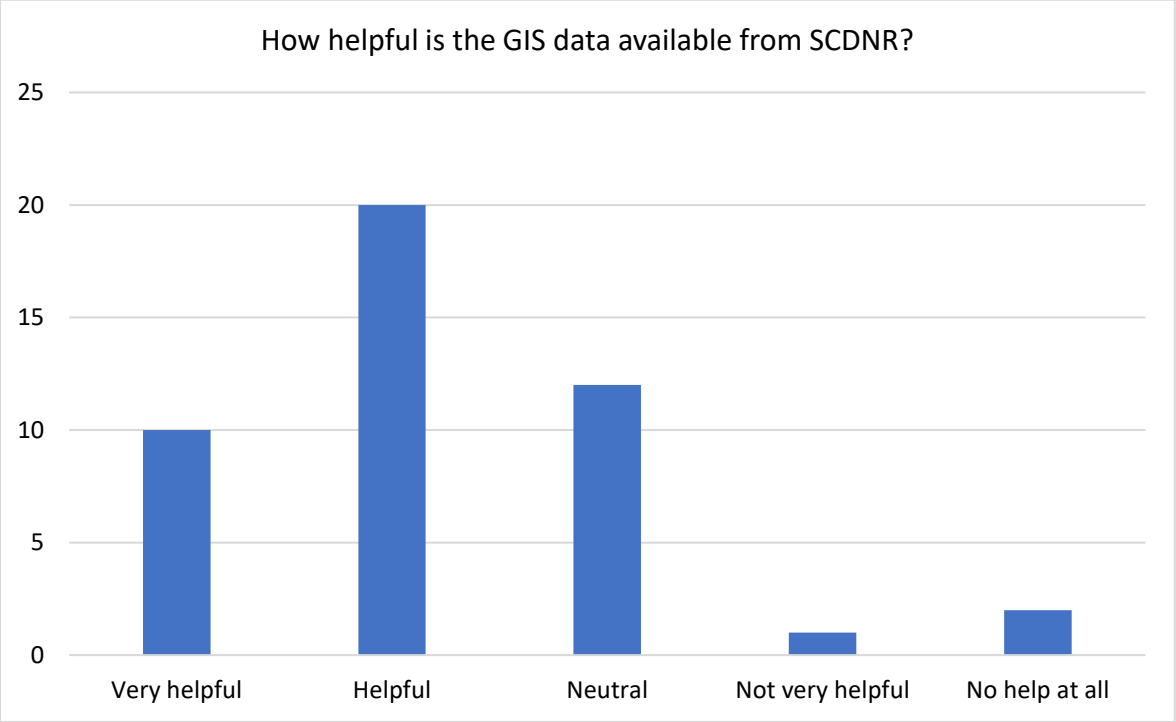
Q6. How easy is it to find the GIS data you need?

Very Easy	0	0%
Easy	15	33.33%
Neutral	21	46.67%
Difficult	7	15.56%
Very Difficult	2	4.44%



Q7. How helpful is the GIS data available from SCDNR?

Very helpful	10	22.22%
Helpful	20	44.44%
Neutral	12	26.67%
Not very helpful	1	2.22%
No help at all	2	4.44%



Q8. I wish there was data for… (includes free responses to question 4).

Responses from this question fell into these major categories. All responses are included at the end of this Appendix.

Water Resources	6
Imagery	5
LiDAR	3
Properties	2
Land Cover	2
Species and Cultural Conservation	3
Law Enforcement	1

Q9. Are there GIS data produced by SCDNR programs you wish you had easier access to?

Yes to all WMAs and HPs

The collector app would be helpful if it could be used for land management applications, data collection.

Probably. But, I am not aware of the data,or possibly even the programs:)

Not that I know of

Not sure. I would have to explore this.

N/a

I would benefit from access to advanced licenses and ArcGIS Pro

I don't use the DNR data often. When I do, I find it difficult to locate the information I want. The watershed and waterway data would probably be most useful to me. I end up using the free background data most of the time.

I can't think of any data I need that I don't have access to; however, I think that making data from different groups available more widely within DNR is really important. Guidance and workflows related to QA/QC, metadata requirements, and anything else that would be needed to take data from an individual research group to be more widely accessible would be very useful!

All responses to question 8 and free responses to question 4.

There is some county LIDAR data that I have a hard time accessing.
Property management activities
Older aerial imagery
LiDAR layers in the Heritage database. I wish there was an up-to-date, fine-scale covertype map.
It would be great to have more options for bathymetry data, or data related to marine and coastal boundaries (i.e. inland limit of salt water/saltwater-freshwater interface)

Integration of the national hydrography datasets and easier means to aggregate upstream factors (e.g., land use, precipitation, river flows, dams, nutrient runoffs, etc.) on estuarine waters.
Inshore water quality layer (salinity over time, dissolved oxygen, etc) , water current flow/tidal flow, better aerial imagery
I wish our marine collection sites from NE FL did not tend to plot out over land. I wish there was an easy way to generate custom bathymetry lines on nautical charts (e.g. many charts have an 18' countour depicted, but I need one at 15'. Detailed ocean bottom type.
I think it would be great to have info about the species of concern in each county. We are out in the field all over the state, and while we are focused on our particular niche, I'm sure there are many of us that have wider interests in the natural world. If there was an easy interface to see
HUC 14 watershed data
Historical Imagery
Current infrared imagery. I think that is perhaps being worked on?
County Parcel data has been difficult to track down, but I believe I have found a contact at Revenue and Fiscal Affairs that has provided that information. The raw data for LidDAR flights (LAS) files would be great to have for my property, but I realize the file size make this very difficult to accomplish.
Consistent, hi-res ortho-imagery, recently captured, for all coastal counties, on the DNR file server

Boundary shapefiles are helpful but most of the time they have not been updated so they are inaccurate.
Basic mapping template files (i.e. all streams and rivers) and packages that have often used map schemas already set up, to increase speed of making maps for presentations or publications.
It looks like I need to check out the data that are available.
I don’t have access or know how to access DNR GIS data
USGS gaging sites, NOAA buoys
To expand on hydrography: bathymetry

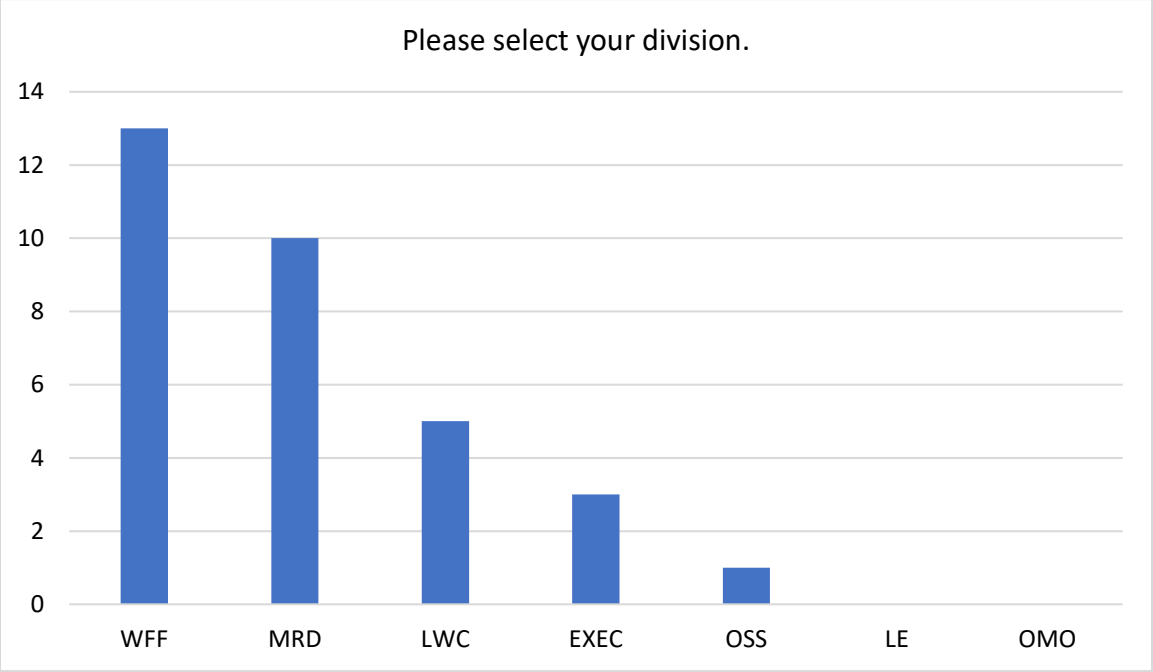
Timber Stand Data that I have/am developing as part of the statewide timber stand database
SCDNR and others species databases (T&E, eagles, crayfish, fish etc)
SALCC Blueprint, MoBI, water quality maps, etc. I rely on Joe!
N/a
LE incident data Education program data
Field data that is not collected via GIS appliaction
Cultural Data, Species Data

Appendix B

Responses to User Survey 2: Access to GIS Support

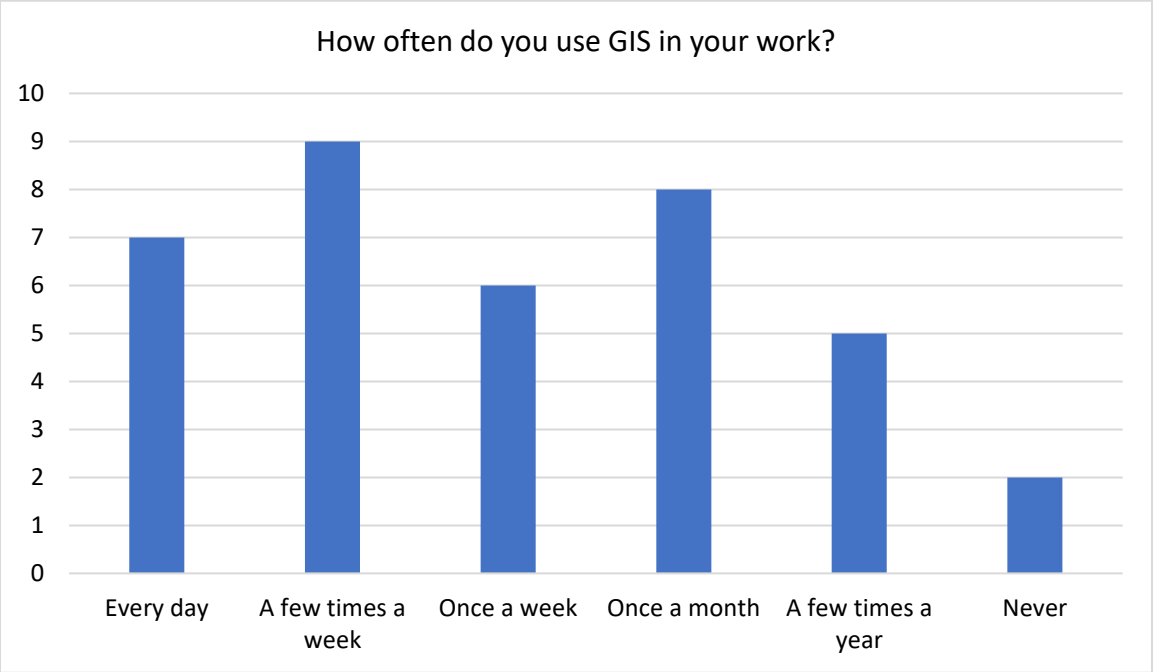
Q1. Please select your division.

WFF	13	35.14%
MRD	10	27.03%
LWC	5	13.51%
EXEC	3	8.11%
OSS	1	2.7%
LE	0	0%
OMO	0	0%



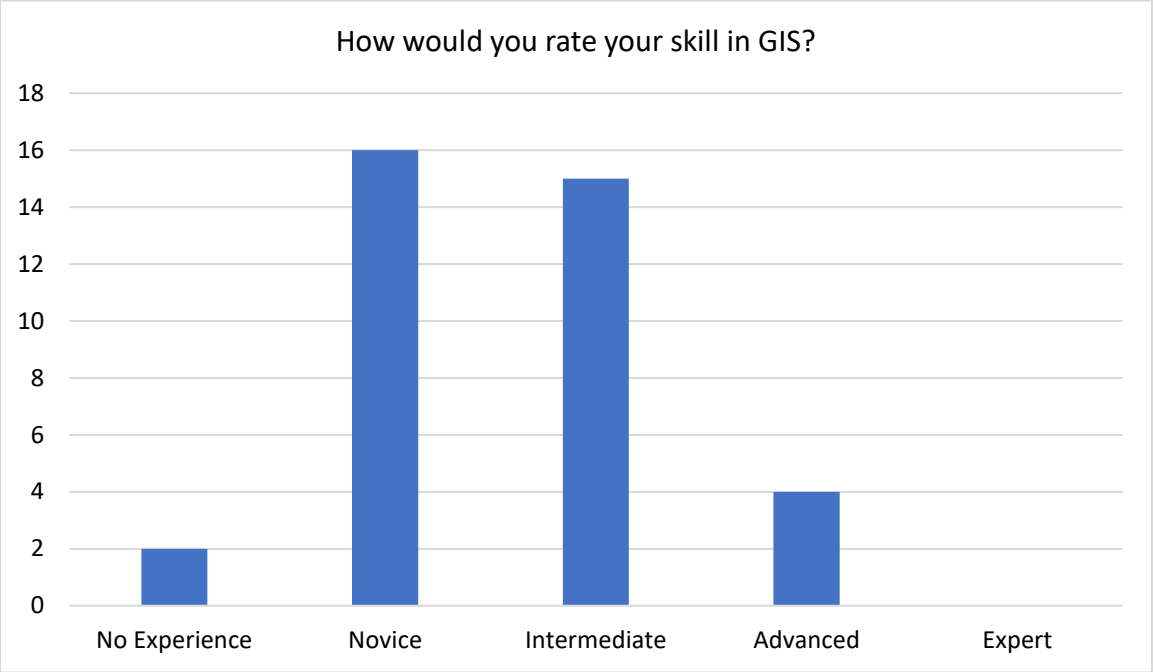
Q2. How often do you use GIS in your work?

Every day	7	18.92%
A few times a week	9	24.32%
Once a week	6	16.22%
Once a month	8	21.62%
A few times a year	5	13.51%
Never	2	5.41%



Q3. How would you rate your skill level in GIS?

No Experience	2	5.41%
Novice	16	43.24%
Intermediate	15	40.54%
Advanced	4	10.81%
Expert	0	0%



Q4. Please select the category that fits you best.

I know what's possible in GIS, but don't know how to do it.	16	43.24%
I know one aspect of GIS well, but I want to learn more about others.	10	27.03%
I want to know what is possible with GIS.	4	10.81%
I want to learn about what's new in GIS.	4	10.81%
I want to know how GIS can help my program.	3	8.11%
What's GIS?	0	0%
I know GIS well. I want to know if certain things are supported.	0	0%

Q5. In the past year, have you… (select all that apply)

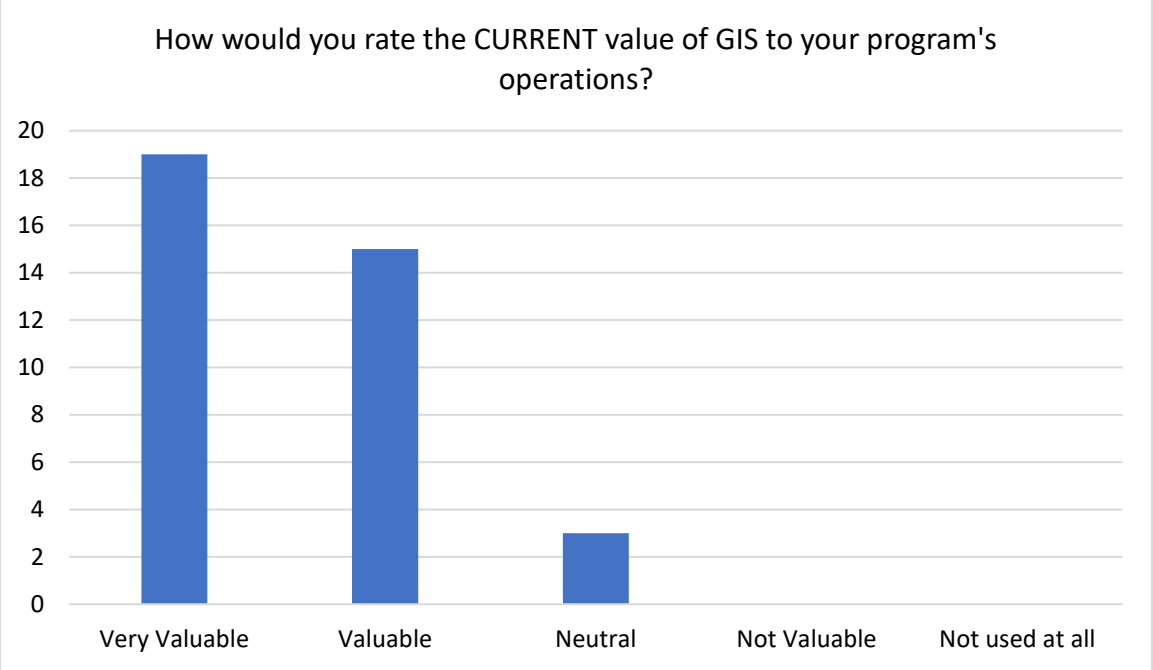
Trained yourself in GIS using resources you found online?	21	56.76%
Received one-on-one help from other GIS users?	18	48.65%
Received one-on-one help from SCDNR GIS Manager?	18	48.65%
Received links to Esri training from SCDNR GIS Managers?	10	27.03%
Attended a GIS users meeting?	9	24.32%
Taken an official course or training in GIS outside of the agency?	6	16.22%
Other	3	8.11%

Q6. What kind of GIS tools do you regularly use? (select all that apply)

Google Earth	31	83.78%
ArcMap / ArcCatalog	29	78.38%
GPS Equipment and Software (any)	18	48.65%
ArcGIS Online / Portal	13	35.14%
ArcGIS Field Apps (Collector, Survey123, etc)	10	27.03%
R (geospatial packages)	6	16.22%
ArcGIS Pro	3	8.11%
Other (please specify)	2	5.41%
QGIS	1	2.7%
Python	0	0%
Model Builder	0	0%

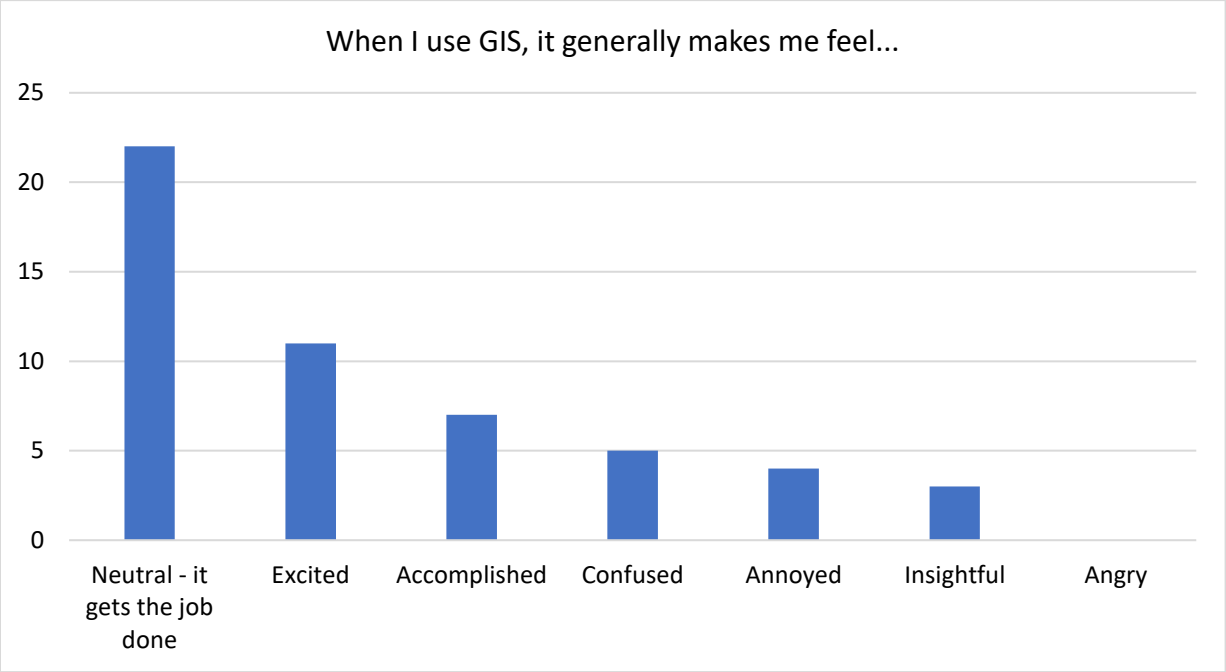
Q7. How would you rate the CURRENT value of GIS to your program's operations?

Very Valuable	19	51.35%
Valuable	15	40.54%
Neutral	3	8.11%
Not Valuable	0	0%
Not used at all	0	0%



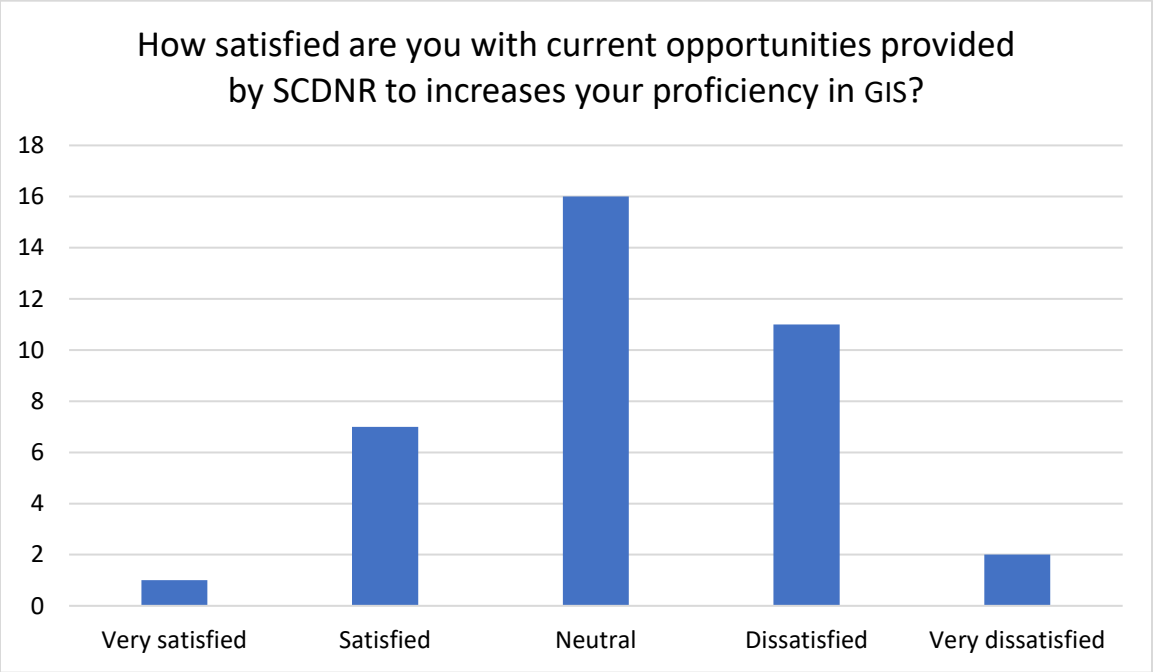
Q8. When I use GIS, it generally makes me feel...

Neutral - it gets the job done	22	59.46%
Excited	11	29.73%
Accomplished	7	18.92%
Confused	5	13.51%
Annoyed	4	10.81%
Insightful	3	8.11%
Angry	0	0%



Q9. How satisfied are you with current opportunities provided by SCDNR to increase your proficiency in GIS?

Very satisfied	1	2.7%
Satisfied	7	18.92%
Neutral	16	43.24%
Dissatisfied	11	29.73%
Very dissatisfied	2	5.41%



Q10. What topics are you interested in learning more about?

Selections are ranked. They are sorted from highest to lowest in the table.

Rank	Topic	Score
1	ArcGIS Pro (New ArcGIS Software)	10.78
2	Fundamentals of GIS	9.81
3	ArcMap	9.41
4	Field Data Collection	8.27
5	Discovering GIS Data	7.54
6	GPS / GNSS Surveying	7.43
7	Using LiDAR Data	7.30
8	Online Apps (ArcGIS Online / Portal)	7.19
9	Advanced Spatial Analysis and Modeling	6.68
10	StoryMaps	5.11
11	Automating Workflows (Python and/or Model Builder)	4.08
12	Remote Sensing	3.97
13	Cartography	3.43

Q11. What kinds of support would be helpful for increasing your skill and use of GIS?

Selections are ranked. They are sorted from highest to lowest in the table.

Rank	Support Method	Score
1	In-person GIS training by SCDNR GIS Managers	6.08
2	Regular webinars hosted by SCDNR GIS Managers	5.59
3	Links to online resources (tutorials, videos, etc)	5.00
4	Official Esri training courses	4.59
5	Guides / Reference documents	4.27
6	Intranet web pages with GIS resources	4.05
7	GIS user group meetings (online or in-person)	3.35
8	Other GIS users sharing their work	3.05

Q12. Would improved GIS learning opportunities increase the value of GIS to your program?

Significant Increase in Value	26	70.27%
Some Increase in Value	11	29.73%
No Increase in Value	0	0%